CLAIMS

1. A heat exchanger comprising a refrigerant inlet header having a refrigerant inlet, a refrigerant outlet header positioned in the rear of the inlet header and having a refrigerant outlet, and a refrigerant circulating passage for causing the inlet header to communicate with the outlet header therethrough, the circulating passage comprising at least two intermediate headers and a plurality of heat exchange tubes for causing the inlet header and the outlet header to communicate with all the intermediate headers therethrough,

the intermediate headers including a refrigerant inflow intermediate header and a refrigerant outflow intermediate header juxtaposed in a front-rear direction, the inflow intermediate header and the outflow intermediate header being held in communication each at one end thereof.

2. A heat exchanger according to claim 1 which comprises a heat exchange core composed of tube groups in the form of a plurality of rows arranged in the front-rear direction, each of the tube groups comprising a plurality of heat exchange tubes arranged at a spacing, a refrigerant inlet header positioned toward one end of each of the heat exchange tubes and having joined thereto the heat exchange tubes of the tube group of at least one row, a refrigerant outlet header positioned toward said one end of each heat exchange tube and in the rear of the inlet header and having joined thereto the heat exchange tubes of the remaining tube group, a refrigerant inflow intermediate header positioned toward the other end of each heat exchange tube and having jointed thereto the heat exchange

tubes joined to the inlet header, and a refrigerant outflow intermediate header positioned toward said other end of each heat exchange tube and in the rear of the inflow intermediate header and having joined thereto the heat exchange tubes joined to the outlet header.

3. A heat exchanger according to claim 2 wherein the outflow intermediate header is provided in interior thereof with first flow dividing control means for causing a refrigerant to dividedly flow into the heat exchange tubes joined to the outflow intermediate header uniformly.

4. A heat exchanger according to claim 3 wherein the first flow dividing control means comprises a first flow dividing control wall having a plurality of refrigerant passing holes for dividing the interior of the outflow intermediate header into first and second two spaces arranged one above the other, the inflow intermediate header and the first space of the outflow intermediate header being held in communication each at one end of the header, and the heat exchange tubes joined to the outflow intermediate header communicate with the second space.

5. A heat exchanger according to claim 4 wherein the refrigerant passing holes formed in the first flow dividing control wall are arranged at a spacing longitudinally thereof.

6. A heat exchanger according to claim 5 wherein the spacing between each adjacent pair of refrigerant passing holes gradually increases as the control wall extends away from said one end of the header where the inflow intermediate header and the outflow intermediate header are held in communication.

7. A heat exchanger according to claim 5 wherein respective adjacent pairs of refrigerant passing holes are equal in spacing.

8. A heat exchanger according to claim 5 wherein the refrigerant passing holes are formed in a portion of the first flow dividing control to the rear of a midportion thereof with respect to the front-rear direction.

9. A heat exchanger according to claim 4 wherein the inflow intermediate header and the outflow intermediate header are provided by dividing a refrigerant turn tank into a front and a rear portion by separating means.

10. A heat exchanger according to claim 9 wherein the turn tank is provided at one end thereof with a communication member for holding the inflow intermediate header and the outflow intermediate header in communication therethrough.

11. A heat exchanger according to claim 9 wherein the turn tank comprises a first member having the heat exchange tubes joined thereto, a second member brazed to the first member at a portion thereof opposite to the heat exchange tubes, and two closing members brazed to respective opposite ends of the first and second members, the second member being integrally provided with the separating means and the first flow dividing control wall.

12. A heat exchanger according to claim 11 wherein one of the closing members has two through holes for respectively causing the inflow intermediate header and the first space of the outflow intermediate header in communication with the inflow intermediate header to communicate with outside therethrough, and is provided with a communication member

brazed to an outer side thereof for holding the two through holes in communication therethrough.

13. A heat exchanger according to claim 12 wherein the closing member having the through holes is platelike and the communication member is a plate having the same shape and size as the platelike closing member when seen from one side, the communication member being provided with an outwardly bulging portion having an inside communication channel for holding the two through holes of the closing member in communication therethrough.

14. A heat exchanger according to claim 13 wherein the closing member having the through holes comprises a main body having a contour shaped in conformity with the cross sectional contour of the turn tank and a protrusion projecting from the main body toward the inlet header and the outlet header, and the outwardly bulging portion of the communication member is formed in corresponding relation with the main body and the protrusion of the closing member.

15. A heat exchanger according to claim 3 wherein the inlet header is provided in interior thereof with second flow dividing control means for causing the refrigerant to dividedly flow into the heat exchange tubes joined to the inlet header uniformly.

16. A heat exchanger according to claim 15 wherein the second flow dividing control means comprises a second flow dividing control wall having a plurality of refrigerant passing holes for dividing the interior of the inlet header into first and second two spaces arranged one above the other, the

refrigerant inlet being in communication with the first space, and the heat exchange tubes joined to the inlet header communicate with the second space.

17. A heat exchanger according to claim 16 wherein the refrigerant passing holes formed in the second flow dividing control wall are arranged at a spacing longitudinally thereof and are smaller than the refrigerant passing holes in the first flow dividing control means.

18. A heat exchanger according to claim 15 wherein the outlet header is provided in interior thereof with third flow dividing control means for causing the refrigerant to dividedly flow into the heat exchange tubes joined to the outlet header uniformly.

19. A heat exchanger according to claim 18 wherein the third flow dividing control means comprises a third flow dividing control wall having refrigerant passing holes for dividing the interior of the outlet header into first and second two spaces arranged one above the other, the refrigerant outlet being in communication with the first space, and the heat exchange tubes joined to the outlet header communicate with the second space.

20. A heat exchanger according to claim 16 wherein the inlet header and the outlet header are provided by dividing a refrigerant inlet-outlet tank into a front and a rear portion by separating means.

21. A heat exchanger according to claim 20 wherein the inlet-outlet tank comprises a first member having the heat exchange tubes joined thereto, a second member brazed to the

first member at a portion thereof opposite to the heat exchange tubes, and two closing members brazed to respective opposite ends of the first and second members, the second member being integrally provided with the separating means, the second flow dividing control wall, and a third flow dividing wall having refrigerant passing holes for dividing the interior of the outlet header into two spaces arranged one above the other.

22. A heat exchanger according to claim 1 wherein the heat exchange tubes are flat and are arranged with their width pointing toward the front-rear direction and are 0.75 to 1.5 mm in height i.e., in the thickness of the tube.

23. A heat exchanger according to claim 22 wherein a fin is disposed between each adjacent pair of heat exchange tubes and is a corrugated fin comprising crest portions, furrow portions and flat connecting portions each interconnecting the crest portion and the furrow portion, the fin being 7.0 to 10.0 mm in height, i.e., in the straight distance from the crest portion to the furrow portion and 1.3 to 1.7 mm in fin pin, i.e., in the pitch of the connecting portions.

24. A heat exchanger according to claim 23 wherein the crest portion and the furrow portion of the corrugated fin each comprise a flat portion and a rounded portion provided at each of opposite sides of the flat portion and integral with the connecting portion, the rounded portion being up to 0.7 mm in radius of curvature.

25. A refrigeration cycle comprising a compressor, a condenser and an evaporator, the evaporator comprising a heat exchanger according to any one of claims 1 to 24.

26. A vehicle having installed therein a refrigeration cycle according to claim 25 as an air conditioner.